

We Claim:

1. An etch mixture for silicon comprising a fluorine-containing gas selected from the group consisting of SF_6 , Si_2F_6 and SiF_4 together with HBr and oxygen.

2. An etch mixture according to claim 1 wherein the mixture additionally includes a noble gas.

3. An etch mixture according to claim 1 wherein the mixture contains SF_6 .

4. An etch mixture according to claim 3 wherein the mixture additionally includes Si_2F_6 and SiF_4 .

5. An etch mixture according to claim 3 wherein the volume ratio of $\text{HBr}:\text{SF}_6$ is 0.1 to 10.

6. An etch mixture according to claim 3 wherein the volume ratio of HBr and $\text{SF}_6:\text{O}_2$ is 0.1 to 10.

7. A method of etching deep, straight walled, rounded bottom openings in silicon comprising plasma etching a silicon substrate with an etch mixture comprising a fluorine-containing gas selected from the group consisting of SF_6 , Si_2F_6 and SiF_4 together with HBr and O_2 in a plasma vacuum chamber, said silicon substrate mounted on a support electrode connected to an RF power source.

8. A method according to claim 7 wherein the fluorine-containing gas is SF_6 .

9. A method according to claim 7 wherein the volume ratio of $\text{HBr}:\text{SF}_6$ is from 0.1 to 10.

10. A method according to claim 7 wherein the volume ratio of HBr and $\text{SF}_6:\text{O}_2$ is from 0.1 to 10.

09032441-061501
T05190" T4T28360